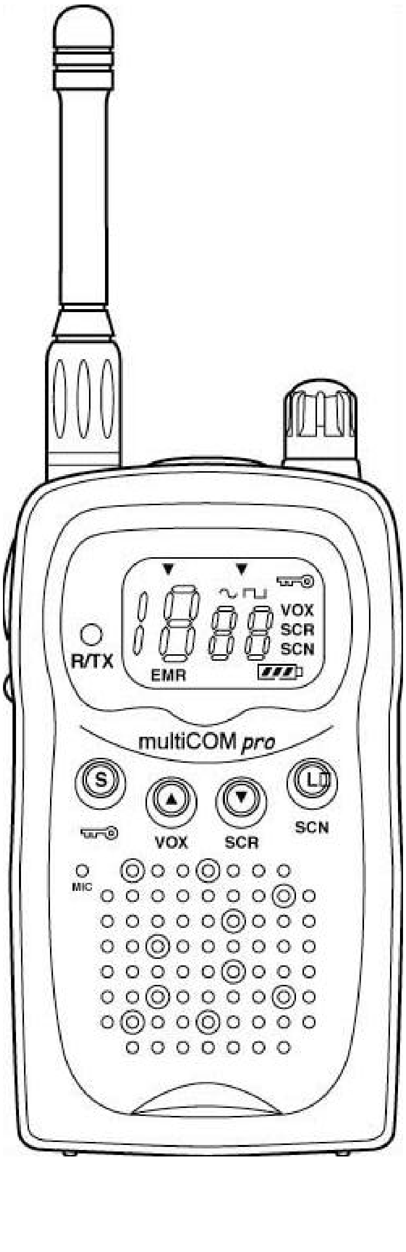
Kommunikationstechnik aus Norddeutschland

Instruction Manual



multiCOM pro

PMR 446 2-Way-FM-Radio

Contents

Getting Started

Foreword

We thank you for purchasing **multiCOM pro**. It is designed for ease of use and made to very high standards. It will provide many years of quality service.

To get maximum benefit from **multiCOM pro**, Please read all instructions carefully and completely. For future reference please keep this user guide

Product Description

multiCOM pro is a sophisticated multi channel, battery powered, 446Mhz FM two-way radio. It is designed for general purpose indoor/outdoor use. It has unique and innovative features that simplify your communications needs. The controls and accessories are easy to use and **multiCOM pro** does not require licence for operation.

multiCOM pro can be used as a handheld radio or attached to a belt and used with several optional accessories for "hands-free" VOX (voice activated) operation or with speaker-mic to control radio conveniently.

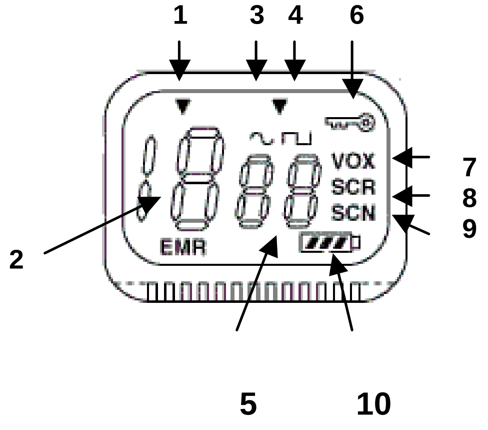
Package Contents

Check that your **multiCOM pro** is complete. When you unpack, you should have

multiCOM Pro Radio Unit
Battery Clip
Handstrap (fitted to the Radio)
Users Manual

Batteries are not included!

Function and Feature Display



1 Channel FLAG' indicates channel select mode.

2 indicates current channel number selected.
(maximum channel : 8)

3 the 'Tone' flag is on when the CTCSS or DCS is activated.
indicates when the radio is in the CTCSS mode.

4 indicates when the radio is in the DCS mode.

5 indicates the Tone (CTCSS/DCS) number.

6 indicates all buttons and key are locked except PTT and On/Off & Volume control.

7 indicates when the radio is in the VOX (Voice operated) mode.

8 indicates when scramble feature is enabled.

9 SCN is on when scan is activated.

10 The battery power status indicator
Fully charged battery - Three segment illuminated
Low charge - One segment is illuminated
Empty – Symbol Flashing

Setting up

Your **multiCOM pro** is designed for use with four “AA” size Alkaline Batteries (not supplied) or rechargeable battery pack. When rechargeable batteries pack is installed, Please charge the batteries pack for at least 12 hours before use. New rechargeable batteries should be fully charged before use. The power to the radio must be turned off during charging.

Warning
Do not use wall charger with Alkaline batteries. It will cause damage to the radio.

Installing the batteries

- Ensure the On-Off switch on the radio is set to off position.
- Hold the radio and battery cover with the back facing you.
- Press down the ‘battery cover latch’ to release the battery cover.
  Note: Use small coin or tool to release battery cover latch.
- Install Ni-Cd Rechargeable battery pack
- or four new “AA” size Alkaline batteries.
  Note: Carefully observe polarity of batteries before installing.
- Slide the battery cover fully up into the radio until the cover release latch clicks into place.

Antenna

The antenna is permanently connected to the radio. It is not detachable.
Please do not attempt to remove the antenna , The radio will be damaged.

Belt Clip

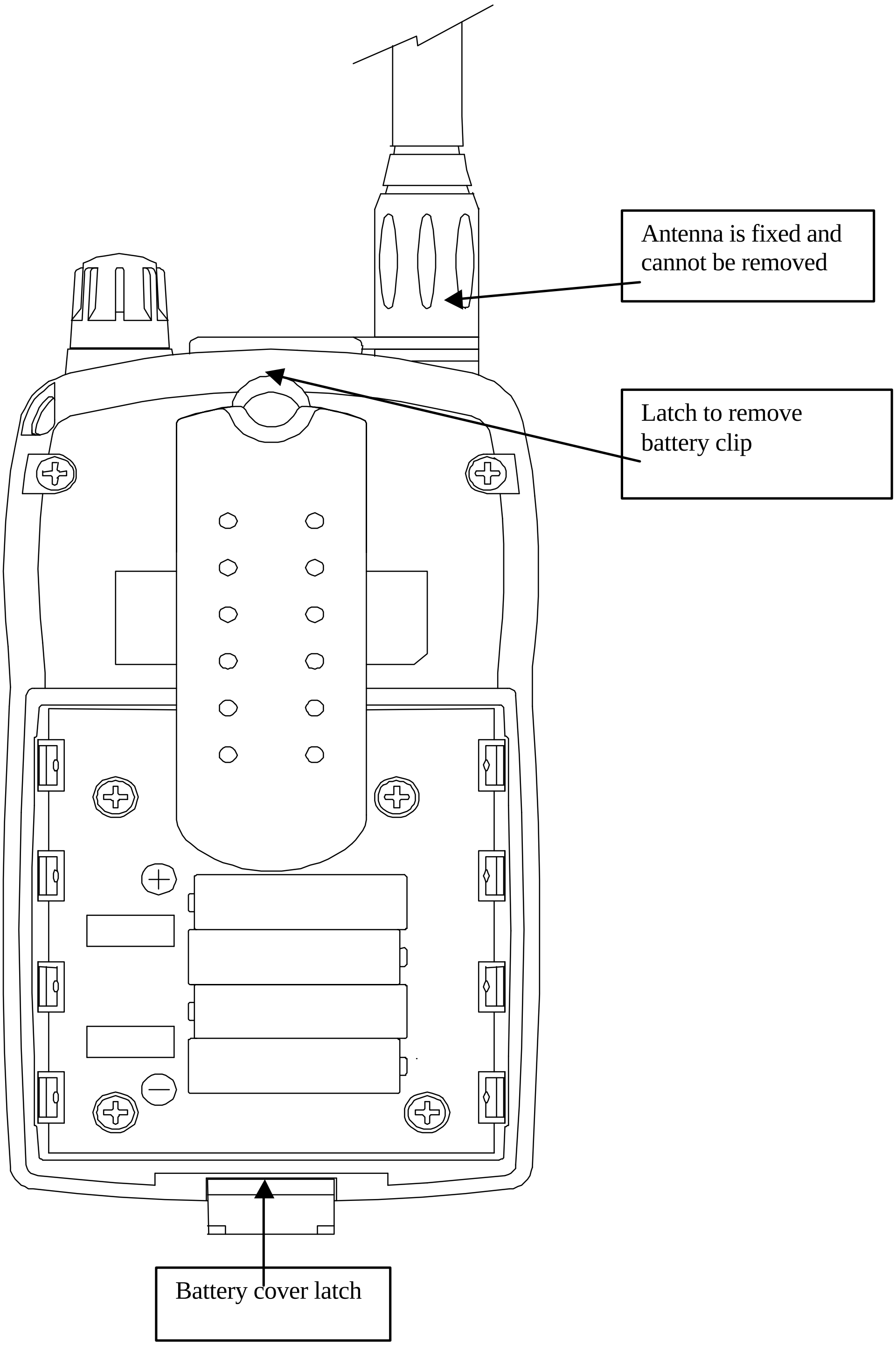
To attach

Slide the belt clip into the plastic grooves at the back of the unit.

To remove

Pull the latch (at the top of belt clip) away from the back of the radio and push the clip downwards.

Transceiver back side



Basic Operation

Turning the radio on :

Rotate this switch clockwise until you hear a 'click'. All indicators will appear momentarily on the display and you will hear short confirmation beep.
The radio will display last mode selected.

Turning the radio off :

Rotate these switches counter clockwise until all indicators disappear on the display.

Setting the volume :

Rotate On-Off & Volume switch to mid position or adjust level that is most comfortable for you.

Selecting the channel and tone code (CTCSS, DCS)

multiCOM pro has total of 976 combination of channel and tone codes.

- 8 Frequency Channels
- 83 CTCSS Code (indicated by ~)
- 38 DCS Code (indicated by ⊓⊔)

Channel and code are configured as follows

To select Channel

- Turn the radio on
- Check the Flag "▼" in display above the channel number is illuminated
  If required, Use [s] key to set mode for channel selection
- Press up[▲] or down[▼] key to select a channel

To Set Tone codes

- Select the channel you want to use.
- Push [s] key to change the mode, channel selection or code selection

(Flag ▼ in the display should be above the tone code digits)

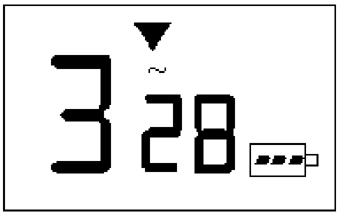
- Press up[▲] or down[▼] key to select desired code

Note: CTCSS and DCS frequency and codes are listed in appendix.

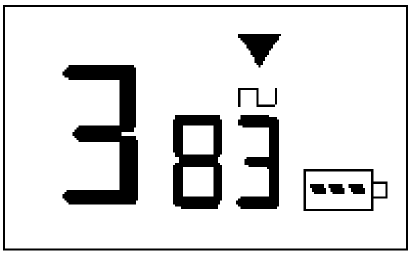
CTCSS Symbol is ~

DCS Symbol is ⊓⊔

Example 1: Channel 3 with CTCSS tone code 28 selected.



Example 2: Channel 3 with DCS tone code 83 selected



Receiving

By Default, **multiCOM pro** uses CTCSS and DCS code system.

The coding system reduces possibility of interference and provides enhanced communication. You can only listen to a call containing correct matching code.

Important:

Before making or listening to a call, always ensure

- Correct channel is selected (1to 8) and
- Correct code is set.

The green LED will be illuminated when the radio has received correct code.

Transmitting

- Hold the radio upright in front of your face at a distant of 2 to 3 inches.
- Press and hold the PTT button (The red LED will be illuminated)
- Speak slowly and clearly.
- To End transmission, release the PTT button.
- The unit will then go to the stand-by mode.

(See also details on Transmitter Time Out – TOT)

Monitoring the channel

It is used for listening weak signal or to hear all activities on the channel by manually overriding channel code setting.

- Press and hold the MON button for over two seconds
- When you hear sound on the channel. Release the MON key.
  (The green LED will be lit on to indicate receive mode)
- Press MON button again momentarily to return back to standby

Locking the keypad

The lock function prevents accidental changes to channel and other radio settings.
All buttons and keys will be locked except the On-Off/Volume and PTT switch.

To Lock Keypad

- Press and hold MON and next press Key [s] (Within two seconds).
- Keypad is now locked (“key” flag will be illuminated in the display).

To Disable Keypad Lock

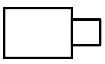
- Press and hold MON and next press Key [s] (Within two seconds).
- Keypad is now unlocked.

Backlight

Backlight is used to improve display visibility.

- To illuminate press the key [L].
- Press this key again to switch off the backlight
  Backlight on display will automatically switch of after two seconds.

Battery status indicator

- The “  ” flag blinks when the battery power is low.

Replace batteries or if using NI-Cd battery pack recharge it.

- Fully charged batteries - Three segments are illuminated
- Low charge - One segment is illuminated

External Speaker - Mic

It is possible to connect many different external accessories to **multiCOM pro** e.g.

- Speaker Mic Unit
- Headset with VOX
- Extension Speaker in 3.5mm socket
- Extension mic in 2.5mm socket

For optimum performance only use approved accessories only.

TOT (Time Out Timer) feature

This function of TOT is to prevent the unit transmitting accidentally. If transmitted accidentally, it will time out and revert to standby mode.
The default value is 2 minutes.

Note: You will be timed out during normal conversation when you have transmitted continuously for 2 minutes. To continue your call, you need to release and press PTT switch.

Enhanced features

Scanning

This feature enables **multiCOM pro** to monitor all channels automatically for valid signal. It does this by scanning all the channels in sequential order and checking for correct matching code.

To activate Scan

- Press and hold MON and next press Key [L] (Within two seconds).
- Radio is now scanning (“SCN” flag will be illuminated in the display).

During scan when a call is detected it will pause for few seconds. During this time if you press UP or Down key the unit will revert to scanning.

To Disable Scan

- Press and hold MON and next press Key [L] (Within two seconds).
- Unit reverts to normal operation.

Scrambler

The **multiCOM pro** is unique in offering this feature; It enables you to have conversation without being over heard in simple scanners and other radios. The scrambler design is based on “Voice inversion technique”; This feature makes your voice messages unintelligible to listeners who don't have a proper decoding device. This is simple security aid and does not provide full protection against eavesdropper.

Important:

To have conversation in scrambling mode, the radios of both parties must have this feature installed. In addition you will not be able to understand conversation when someone calls you without the scrambler feature.

To activate Scrambler

- Turn the radio off
- Press and hold down[▼] key (also labelled SCR)
- Turn the radio on (SCR will be illuminated in display)

To disable Scrambler

- Turn the radio off
- Turn the radio on (The unit will revert to normal operation)

VOX (Voice Operated Switching)

This option enables you to have handsfree conversation. You no longer need to operate the PTT button each time you want to speak. When using the external mic or headset, your voice or the signal is detected and radio transmits automatically. You can also control the VOX sensitivity to suit your environment of operation. (E.g. noisy road, motor bike, factory etc.)

To set radio for VOX operation

- Turn the radio off
- Press and hold up [▲] key (also labelled VOX)
- Turn the radio on (VOX will be illuminated in display)

Setting up VOX sensitivity

- Ensure radio is in VOX operation
- Press and hold MON and next press up [▲] key (also labelled VOX)
- The display will indicate present VOX sensitivity setting e.g. 'L-01'
- Use up[▲] or down[▼] key to select desired VOX setting

  Level 1 is most sensitive

  Level 10 is least sensitive.

Other Functions

Customisation

multiCOM pro has many features and function that can be customised for special applications. Customisation is only possible by programming unit with Standard PC serial port. This is done by using programming cable (not supplied) and the programming software (DOS, works also with Win 95/98).

Please contact your supplier or Authorised agent for details.

Programming mode

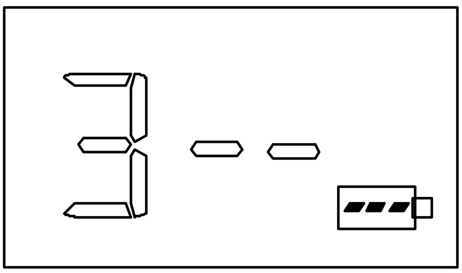
To activate Programming mode

- Turn Radio Off
- Push and hold MON switch.
- Turn the radio on ("Prg" will be illuminated in display)
- Connect programming cable to serial port of PC
- Connect programming cable to mic input of radio
- Unit is ready for programming
- Run the programming software (not supplied).

Each of the eight channels in **multiCOM pro** can be programmed with following six modes of operation.

Free Channel

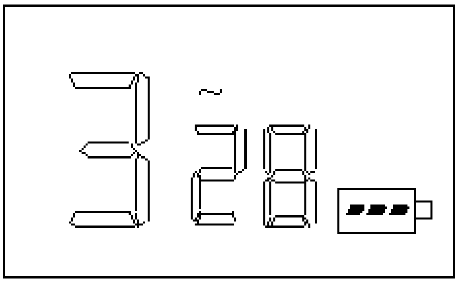
The channel without any tone code setting



Channel 3 is selected (without any code)

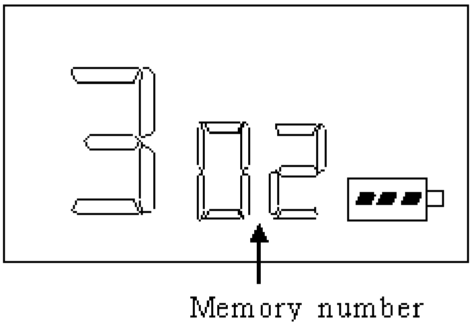
Fixed Single Tone Setting

Each of 8 channels can be programmed to have one of CTCSS(38) or
DCS (83) code fixed. The user will not be able to change this code by keypad



Channel 3 with CTCSS tone Code 28 selected

Memory Operation



Each of 8 channels can be programmed to have up to 5 memory settings of different combination of CTCSS and DCS codes

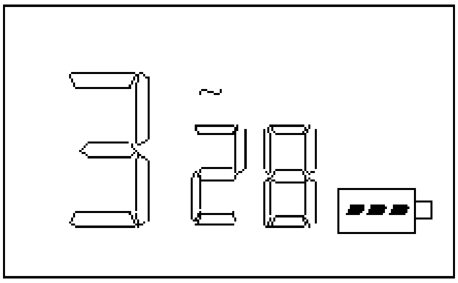
Typical setting could be

- Memory1: CTCSS - 67Hz
- Memory2: DCS - 023
- Memory3: without tone
- Memory4: CTCSS - 250.3Hz
- Memory5: CTCSS - 67.0Hz

In memory mode the "▾" flag will be blinking.

CTCSS tones only

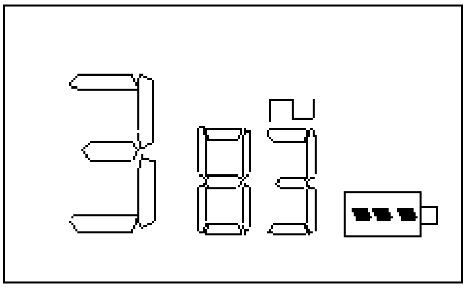
Each of 8 channels can be programmed so that user can only select one of 38 CTCSS tones.



Channel 3 with CTCSS tone Code 28 selected

DCS tones only

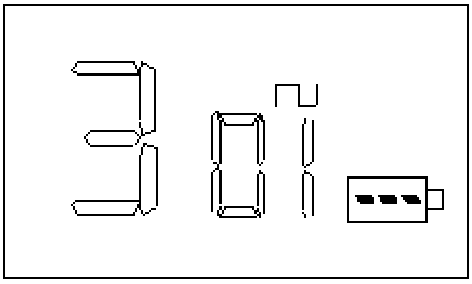
Each of 8 channels can be programmed so that user can only select one of 83 DCS tones.



Channel 3 with DCS tone Code 83 selected

CTCSS (38) and DCS (83) – [default setting for all the channels]

Each of 8 channels can be programmed such that user can select one of CTCSS (38) or DCS (83) code.
Total of 121 combinations per channel.



Channel 3 with DCS tone Code 01 selected

To Select Tone codes

- Select the channel first
- Push [s] key to change the mode, channel selection or code selection (Flag ▼ in the display should be above the tone code digits)
- Press up[▲] or down[▼] key to select desired code

Transmitter Time Out Timer (TOT) Programming

The default values of Transmitter time out (TOT) and Voice operated switching (VOX) values can be changed also by computer programming.

Cloning:

Once the radio is programmed its parameters can be transferred to another radio by using special programming cable (not supplied). With this cable the complete settings of one radio can be transfered (copied) to another radio without any need of a computer, only cable is required

Important Safety Informations

Operating Environments

- Never operate radio very close or touching to exposed parts of the body.
- Avoid conditions, which subject radio to shock and extreme vibrations.
- If possible, refrain using this radio under the direct rays of the sun and around the high humid area.
- Never operate radio with high volume levels. Hearing expert's advice against continuos high volume operation.
- Do not operate the radio in explosive atmosphere.

Battery Charging Precautions

Never attempt to charge alkaline batteries. This will damage the radio and can cause explosure of the batteries and even injuries.

- Only use approved battery charger.
- Always switch off the radio when charging.
- Never use simultaneously wall and desk chargers.
- Avoid overcharging the battery. Charge battery for less than 48 hours
- Keep battery contacts clean.
- For environmental reasons, please dispose of batteries carefully.

Technical Specifications

General

Frequency Range	: 446.00625 to 446.09375MHz
Channels	: 8CH
Channel spacing	: 12.5kHz
Communications	: Simplex
Modulation System	: F3E
Antenna Type	: Fixed Helical Antenna
Audio Output	: 0.4W or more (16Ù)
Operation Temp. Range	: -20degC ~ +55degC
Power Source	: Ni-cd (4.8V DC) or
	: Alkaline(6V D.C) batteries
Dimensions	: 62(W)×109(H)×34(D) m/m
Weight	:140g or less (batteries excluded)

Transmission

Power Output	: 0.5W max ERP
Frequency Stability	: within ±0.0003%
Modulation Type	: FM
Max. Freq. Deviation	: ±2.5kHz or less
Spurious Emission	: better than -65dB
Modulation Distortion	: 3% or less

Reception

Sensitivity	: less than 0.25uV
Selectivity	: better than -60dB
Spurious Response	: better than -70dB
Signal to Noise Ratio	: better than -65dB
Audio Distortion	: within 3%
Frequency Stability	: within ±0.0003%

Tone Code Tables

DCS-Codes

Number	DCS-Code	Number	DCS-Code	Number	DCS-Code
01	023	29	174	57	445
02	025	30	205	58	464
03	026	31	223	59	465
04	031	32	226	60	466
05	032	33	243	61	503
06	043	34	244	62	506
07	047	35	245	63	516
08	051	36	251	64	532
09	054	37	261	65	546
10	065	38	263	66	565
11	071	39	265	67	606
12	072	40	271	68	612
13	073	41	306	69	624
14	074	42	311	70	627
15	114	43	315	71	631
16	115	44	331	72	632
17	116	45	343	73	654
18	125	46	346	74	662
19	131	47	351	75	664
20	132	48	364	76	703
21	134	49	365	77	712
22	143	50	371	78	723
23	152	51	411	79	731
24	155	52	412	80	732
25	156	53	413	81	734
26	162	54	423	82	743
27	165	55	431	83	754
28	172	56	432		

CTCSS-Tones

Number	Frequency (Hz)	Number	Frequency (Hz)	Number	Frequency
00	kein Ton	13	103.5	26	162.5
01	67.0	14	107.2	27	167.9
02	71.9	15	110.9	28	173.8
03	74.4	16	114.8	29	179.9
04	77.0	17	118.8	30	186.2
05	79.7	18	123.0	31	192.8
06	82.5	19	127.3	32	203.5
07	85.4	20	131.8	33	210.7
08	88.5	21	136.5	34	218.1
09	91.5	22	141.3	35	225.7
10	94.8	23	146.2	36	233.6
11	97.4	24	151.4	37	241.8
12	100.0	25	156.7	38	250.3

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